

A Brief look at the NIST Assessment of the U.S. Measurement System (USMS)

NIST USMS Task Group
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Introduction

- This nation's measurement system (the USMS) is the complex of all the people and institutions, private and public, that make, use, or serve to insure the validity of measurements
- Those measurements are carried out across the entire spectrum of the economic activity, from business, trade, and commerce, through medicine and health care, to government and defense
- Everyone in the U.S. depends upon measurements in a myriad of ways every day
- No one is in charge – no institution, no individual has authority over the system that produces those measurements

NIST Assessment of the USMS

- NIST is the U.S.'s National Measurement Institute and is responsible for the U.S. national standards of physical measurement
- In that capacity it has accepted the challenge to take a look to see whether the U.S.'s measurement system is meeting the nation's measurement needs
- To do so, the NIST Director established an objective for NIST to produce an assessment of the USMS by June 2006
- This presentation summarizes briefly the approach, output, and intended benefits of the assessment

Logic of the NIST Look at the USMS

Technological innovation is a major source of the nation's economic well-being and military strength

Most of U.S. industry's most critical needs in measurements are linked to technological innovation

It is a primary function of the U.S. measurement system to deliver measurements that meet U.S. industry's measurement needs

An assessment of the state of the USMS can be based on a survey and analysis of industry measurement needs

From the assessment, an action plan can be developed to address the industry needs and systemic problems identified

Basic Methodology of the Assessment

- Focus on measurement problems that pose technical barriers to economically important technological innovations
- Use an economic model of technological innovation as the basis for specifying the measurement needs
- Survey the space of measurement needs from different perspectives (sectors, technologies, SI units, disciplines)
- Use industry-need workshops, industry technology roadmaps, interviews, and other fact-finding techniques as input
- Compile and analyze measurement needs
- Generate findings
- Authenticate measurement needs and findings outside NIST
- Distribute the report widely to stakeholders
- Carry out follow-up actions

The Bases for the Survey of the Space of Measurement Needs

Sectors	Semiconductor, Automotive, Software
Technologies	Broad (including Nanotechnology, Bio-/Medical Imaging, Disaster First-Responder) and Discrete (including Workshop Topics)
SI Units	Mass, Length, Time, Electrical Quantities, Temperature, Amount Substance, Luminous Intensity
Disciplines	Physics, chemistry, material science, electrical engineering, civil-mechanical engineering, manufacturing engineering, computer-IT sci-eng

The Datum of Input to the USMS Assessment: An Industry “Measurement Need” (MN)

Information	Technological innovation at stake Economic significance of the innovation Technical barrier to the innovation Stage of innovation at which technical barrier appears Measurement-problem part of the technical barrier Potential solutions to the measurement problem Potential providers of these solutions Government role, if any, in these solutions
Format	One page, crafted, with documented support

Output and Intended Effect of NIST Look at the USMS

The June 2006 NIST USMS report will include

- the industry measurement needs identified
- findings on measurement needs and systemic problems
- follow-up actions to achieve solutions to those needs and problems

The intended effects of the report are that it will

- engage providers of solutions in the measurement problems ID'd
- bring the attention of stakeholders to bear on systemic issues
- catalyze identification of other measurement needs

Conclusion

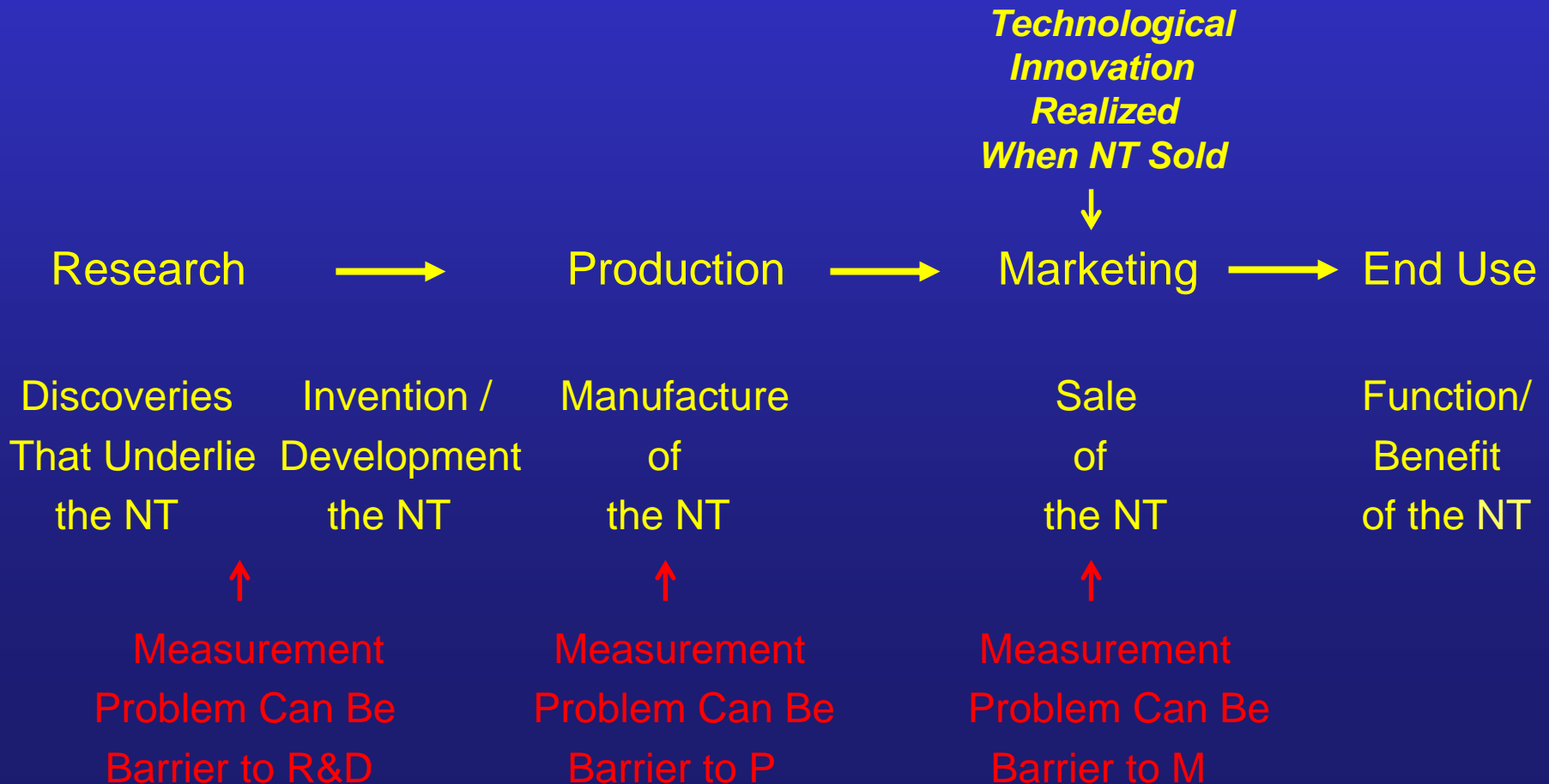
- This has been a brief look at the on-going NIST assessment of the U.S.'s measurement system
- It is a challenging task that we think will provide real benefits
- I appreciate your attention and am happy to answer any questions you might have about it

Supplemental Slides for Use to Expand the 4-Slide Summary or to Respond to Questions

- Introduction, including Definition of Measurement System
- Logic of Assessment and Focus on Technological innovation
- Bases for Survey: Perspectives to Look for Needs
- Economic Model and Measurement Barriers
- Specific Examples of Measurement Barriers
- The Measurement-Need Template
- List of Task Group Members

Economic Model of Measurement Problems as Barriers to Technological Innovation

Technological Innovation = Introduction into Marketplace of New Technology
Moved from Research through Production and Marketing to End Use



Examples of Measurement-Problem Barriers to Technological Innovation

- **Barrier at Marketing** A U.S. instrumentation company develops a digital multi-meter with linearity and precision that it believes, but cannot prove to customers, far beyond anything else commercially available
- **Barrier at Mfg** U.S. producers of integrated-circuit photomasks cannot reproducibly establish the widths of the new-generation features on the masks they are making because of mysterious discrepancies in measured widths
- **Barrier at R&D** U.S. developers of carbon-nanotube based materials are stymied in getting predictable results by inability to define the composition of the nanotube additive in terms of purity, count and distribution of lengths of nanotubes

Technical OU Reps and ATP Economists for Help on Production of MNs

Clare Allocca	MSEL
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Kari Harper	MEL
Cameron Miller	PL
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